Beyond the Search for Hydrocarbons in Greece

Hellenic Hydrocarbon Resources Management SA

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Zoom on Greek acreage onshore and offshore

E&P update October 1st 2019
Greece in the Eastern Mediterranean
The gas tiles of Eastern Mediterranean and Black Sea

Recent gas discoveries

Expected gas discoveries

Nile delta

Recent gas discoveries and gas production
Eastern Mediterranean and Black Sea

Prospects to be explored

Fields discovered

Fields Discovered and Producing
Technical and economical attractiveness of the SE Mediterranean

Convergence of five technical and economic reasons

Recent large discoveries of gas in the SE Mediterranean and Black Sea
New geological concept model added since 2015 in the Mediterranean
Progressive improvement of deep and ultra-deep drilling technologies
Increasing commercial importance of natural gas
Diversification of gas supply for the European market
Deep water, gas plays and time agenda for ultradeep waters

1 and 2, from older to more recent gas discoveries (in red). The water depths increase from region 1 to 2 and 3.
New geological concept model added since 2015
If you take out 3000 meters of water, exploration will progressively move from north to south and from shallower less than 1,000 meters (yellow) to important water depths of more than 3,000 meters (dark blue).
Need for energy

United Nations World Population Projections through 2100

To keep per capita energy consumption constant at 2019 levels would require World consumption to increase to 70 times 1850 levels by 2050 and 80 times by 2100.

To keep total World energy consumption constant at 2019 levels, per capita consumption must decrease 22% by 2050 and 32% by 2100.

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Increasing production from ultra deepwater environments

![Graph showing increasing production from ultra deepwater environments.](image)

- 13 mbbl/d
- 5 mbbl/d
- 16 mbbl/d
- 30 mbbl/d
Improvement of drilling technology with increasing water depth
Ultradeep waters

Challenges

- Pore pressure, fracture gradient, pressure window
- Shallow well sections
- Deep well sections
- Salt Drilling
- Tar deposits
- HPHT
- Number of casings
- Well control issues
- Rig and equipment issues
- BOP issues and limitations

Technologies

- Enhanced topsides facilities, improved hulls, stronger moorings and risers
- Advanced subsurface tools and monitoring equipment
- Improved modelling tools for safer vessel designs from explosion hazards and violent sea events
- Development of “next generation” metocean and meteorological predictive techniques
When midstream and upstream meet

The red arrows represent the gas transportation projects EastMed, TAP and the project associated with the Neptun discovery (area 2). The arrow towards Egypt to Damietta or Idku LNG facilities.

Concessions onshore and offshore Greece
New promoted acreage
PIPELINE versus LNG: Dilemma or complementarities

![Graph showing transportation cost vs. distance for different methods of gas transportation (Gas Pipeline: Offshore, Gas Pipeline: Onshore, LNG). The graph illustrates the cost per MMBtu at various distances. The EastMed length and TAP length are marked on the graph. The source is Institute of Gas Technology.](image-url)
Status of gas transportation infrastructures
Zoom on Greek acreage onshore and offshore

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